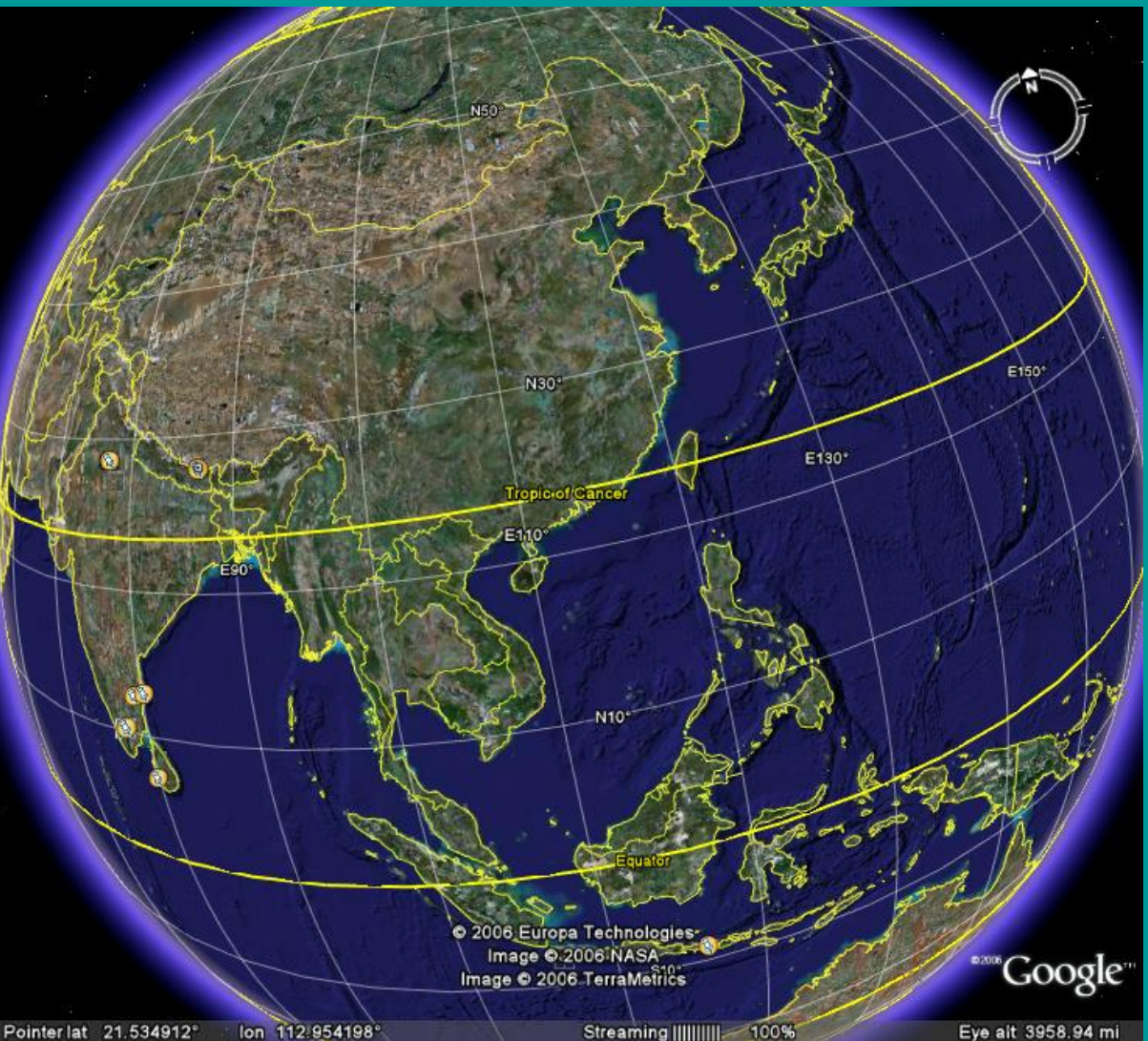
Influenza in Asia



M C Steinhoff

Johns Hopkins University

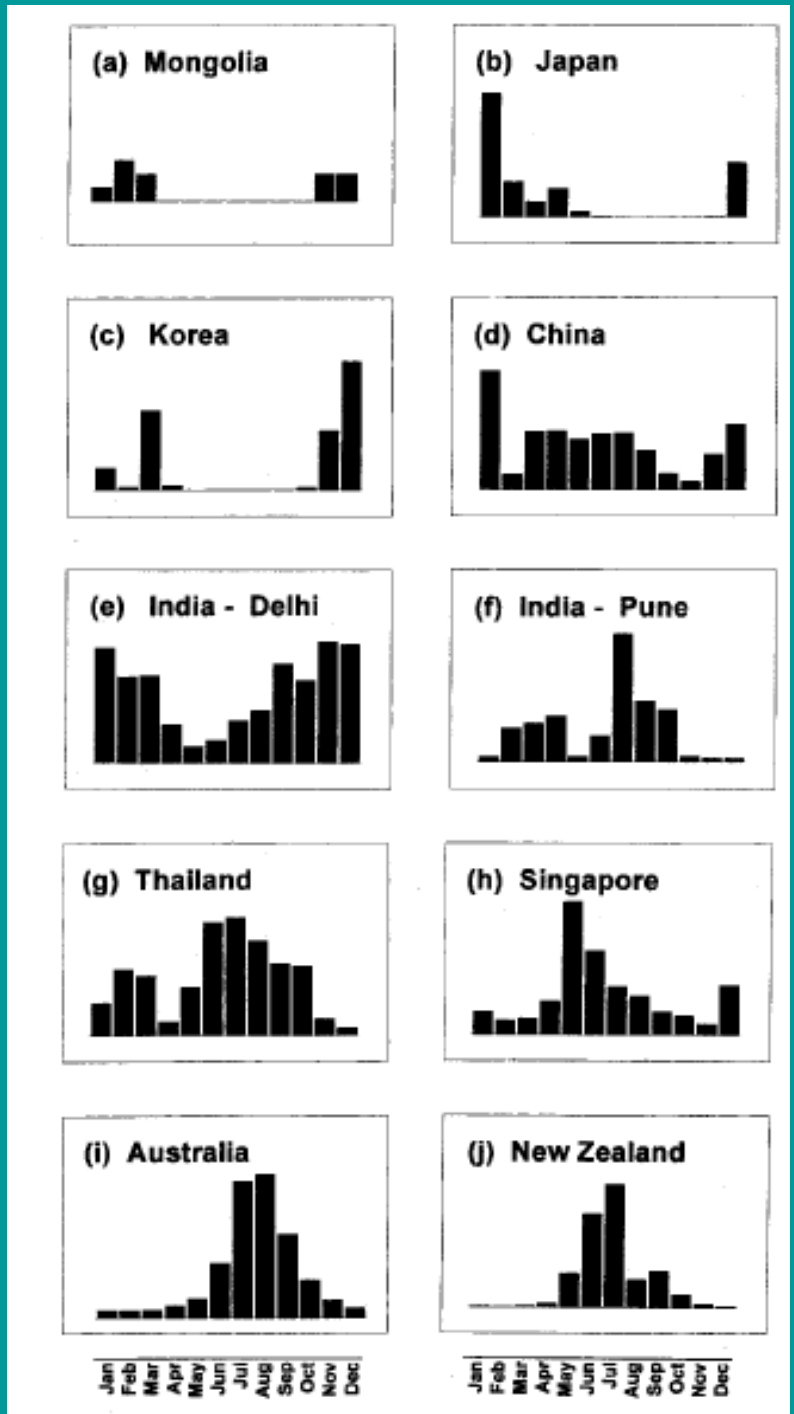
USA

Plan of discussion

- Surveillance and disease burden data
  - Seasonality, age-specific illness rates
- Vaccine use and production
- Policy considerations

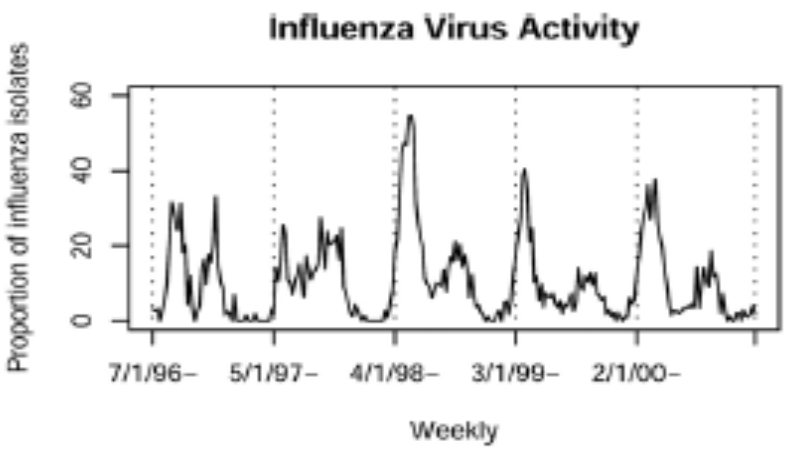
Surveillance for influenza: issues in some Asian countries

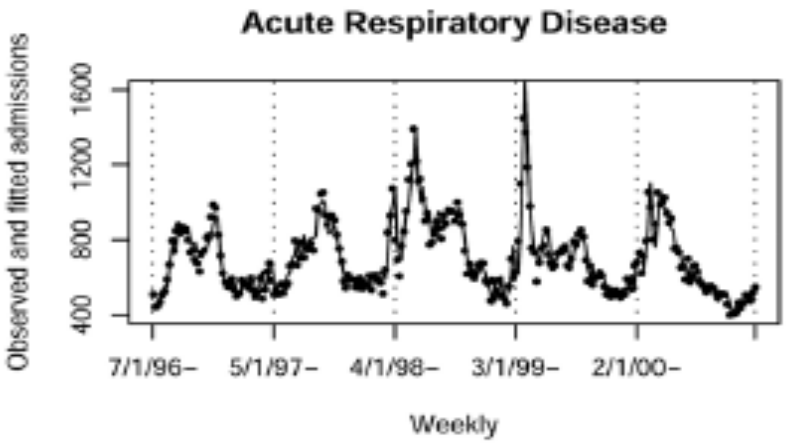
- Flu epidemics not clinically recognized in many tropical settings
- Many causes of febrile illness, no obvious seasonal increase of febrile respiratory infection
- Virology laboratories with expertise not widely available
- Antiviral treatment not available
- No data on outcomes

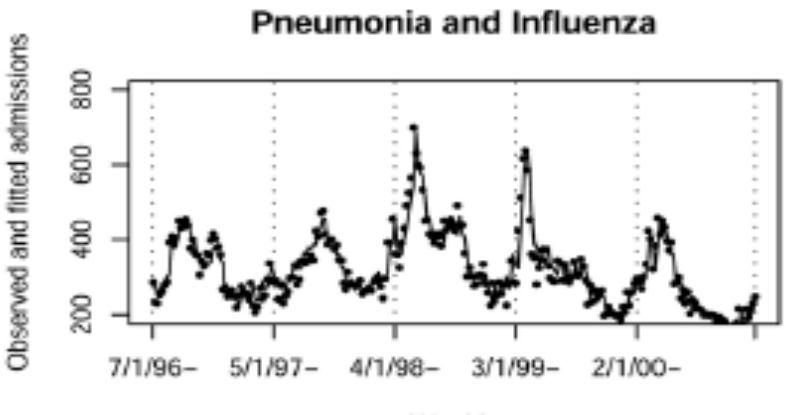


Review of influenza data in Asia, 1999

A.W. Hampson / Vaccine 17 (1999) S19±S23







Seasonality in Hong Kong.

C.M.Wong,
PLOS Medicine 2003;3:e121

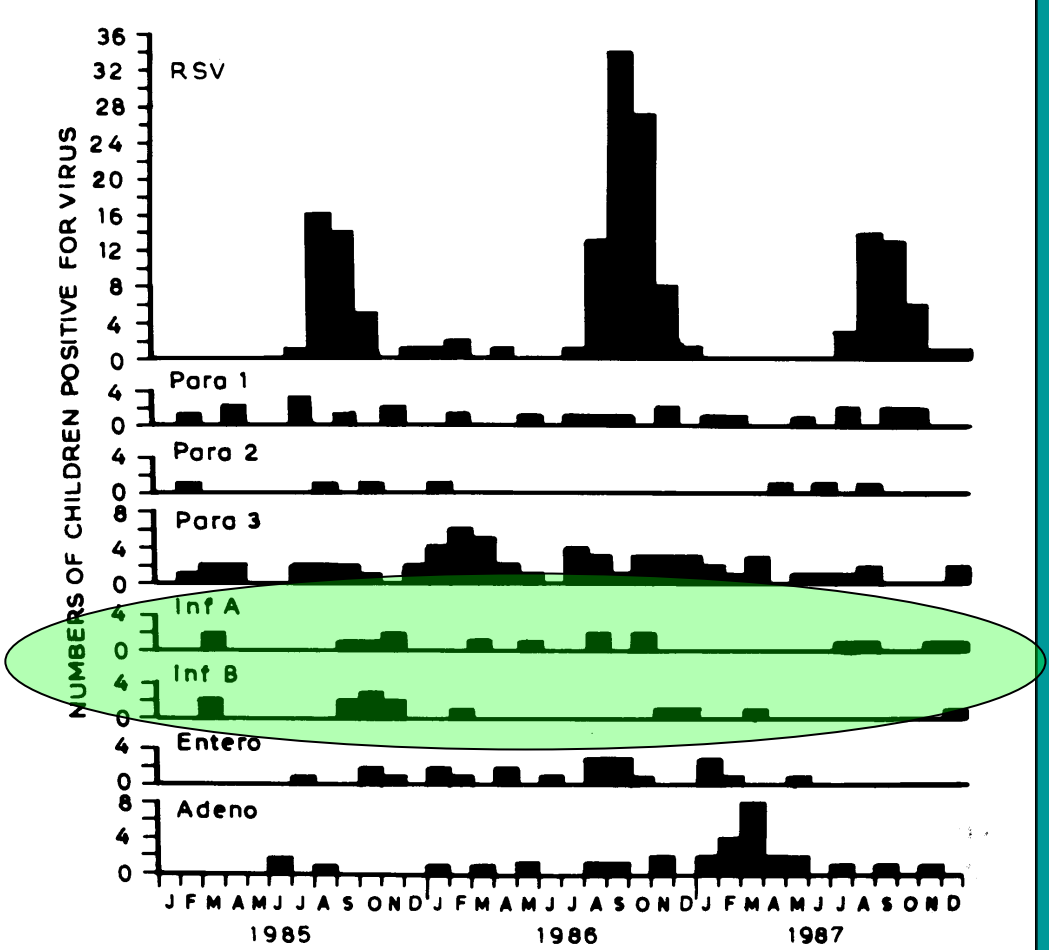


Figure 1. Frequency of viral infection, by month, in children with ARI, 1985–1987. Para 1 = parainfluenza 1 virus; Para 2 = parainfluenza 2 virus; Para 3 = parainfluenza 3 virus; Inf A = influenza A virus; Inf B = influenza B virus; Entero = enterovirus; Adeno = adenovirus.

From a study of 809 children in clinics and wards, Child Health, CMCH, Vellore,

India,

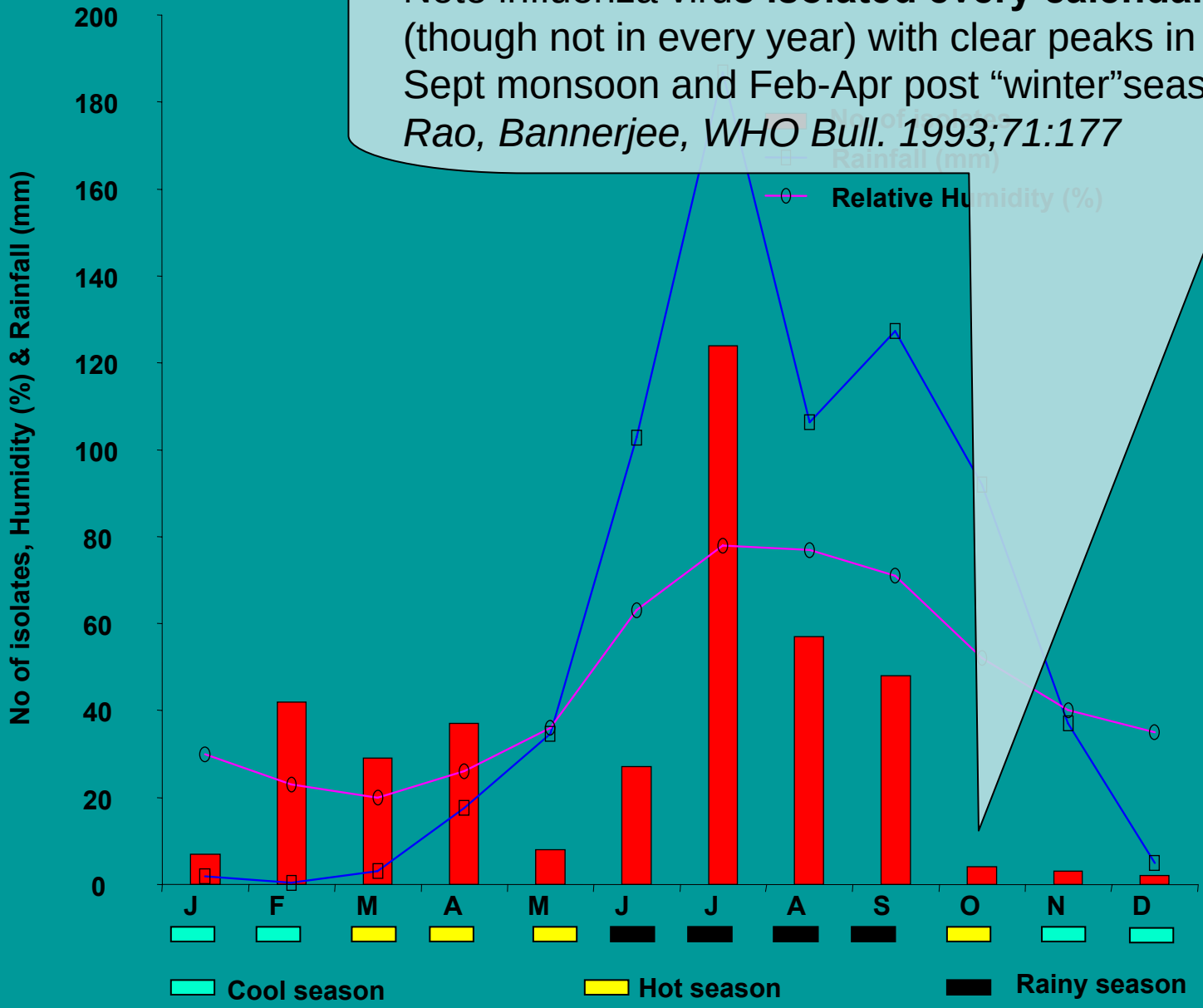
1985-87

Culture system was not optimized for influenza, yet still showed flu in 15 of 36 months, with May (SWM), Nov (NEM) peaks.

Source: John TJ, Cherian T, Steinhoff MC, Simoes EA. F, John M. Etiology of Acute Respiratory Infections in Children in Tropical Southern India. Rev Infect Dis 1991;13(Suppl 6):S463-69

Human Influenza Surveillance at NIV, Pune, 1976-2002

Note influenza virus **isolated every calendar month** (though not in every year) with clear peaks in July-Sept monsoon and Feb-Apr post "winter"season.
Rao, Bannerjee, WHO Bull. 1993;71:177



Influenza surveillance in Chennai 2002

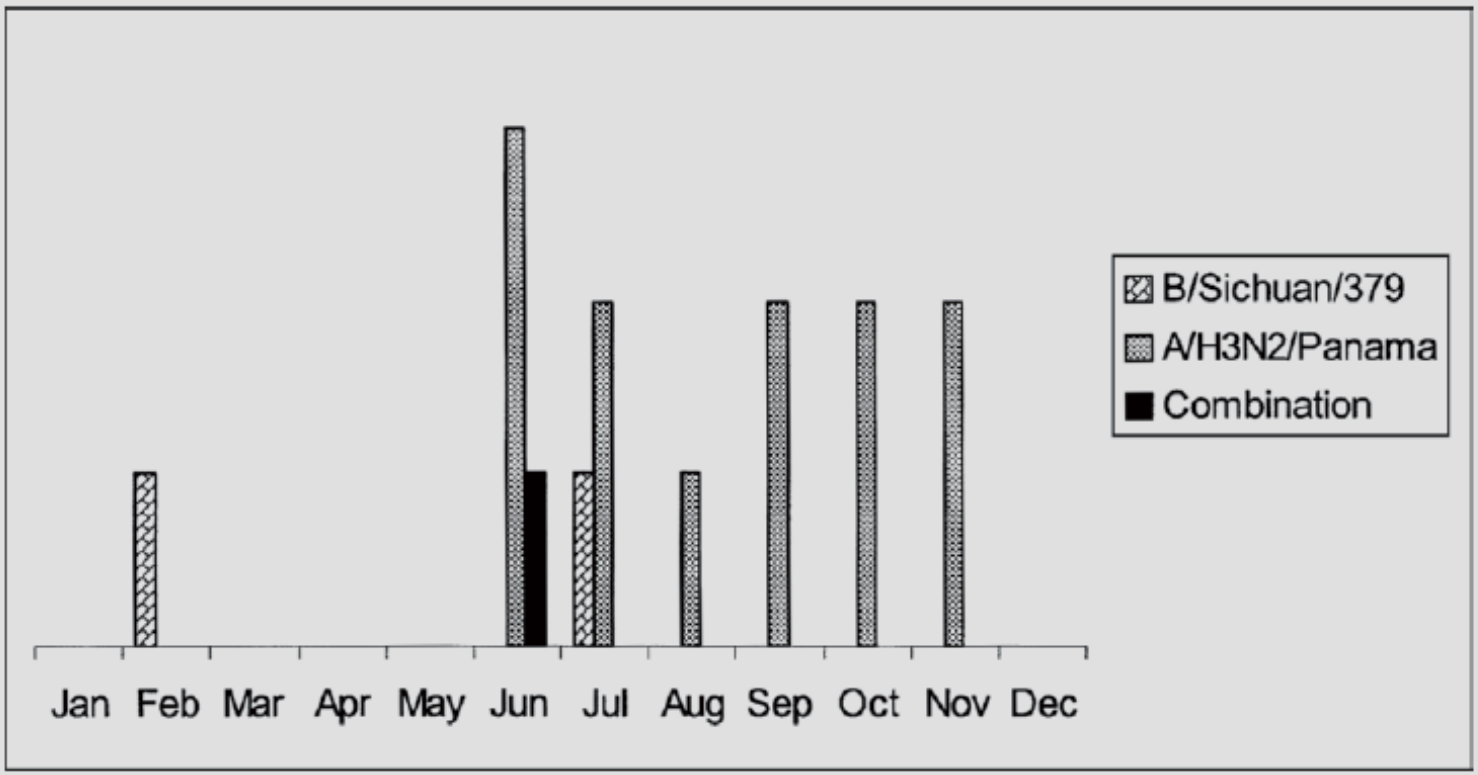


Fig. Month-wise isolation of influenza viruses during the year 2002.

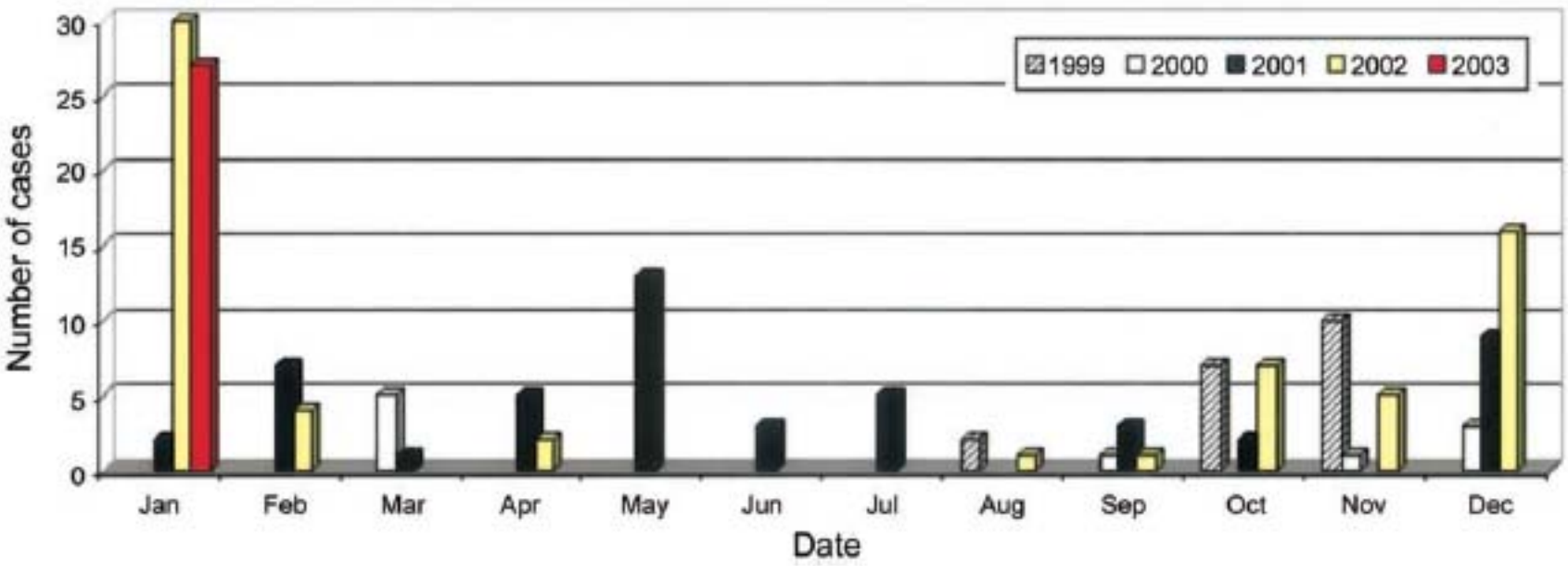
Note flu present during 7 of 12 months

source: Ramamurthy N, et al.
Indian J Med Res.2005; 121:776-779.

Influenza surveillance, Delhi

- 200 specimens from children.
- Influenza virus was isolated in 12%, mostly from children with pneumonia or bronchiolitis.
- In 17 months, there were influenza isolates in every calendar month, but with a seasonal peak between September and December

(Maitreyi RS, J Clin Virol 2000;16(1):41-7.)

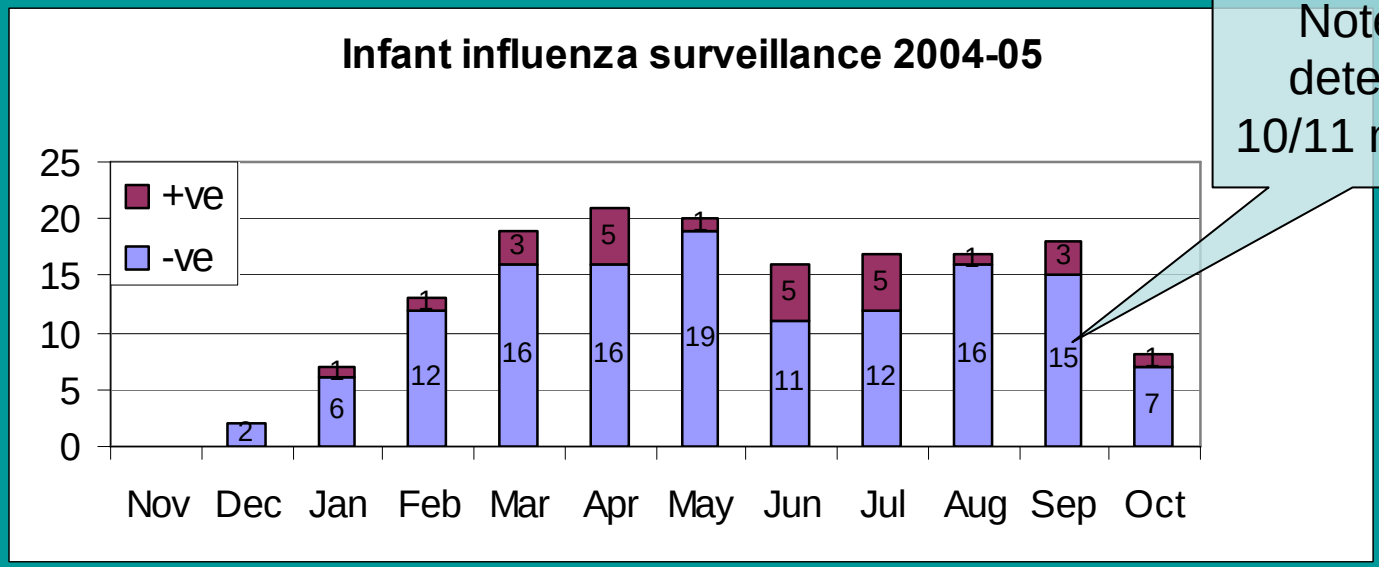


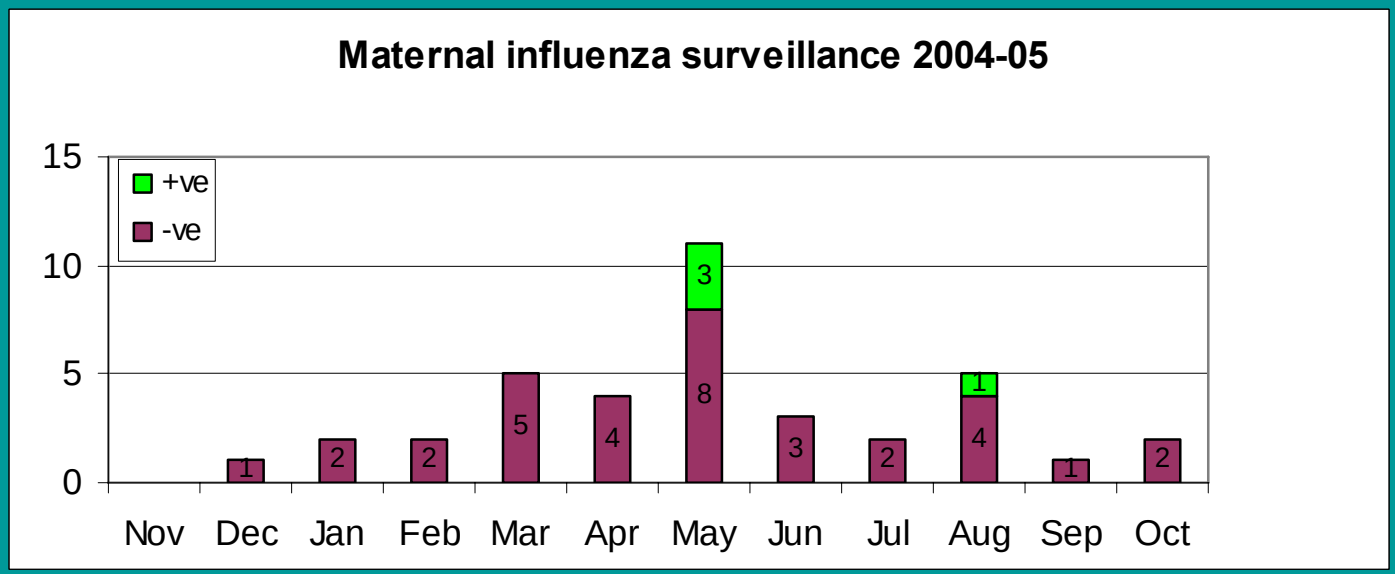
Influenza Surveillance in Indonesia, NAMRU lab

C G Beckett,• **CID 2004:39**

Influenza surveillance in infants in Dhaka Bangladesh, using rapid detection tests

2004-2005

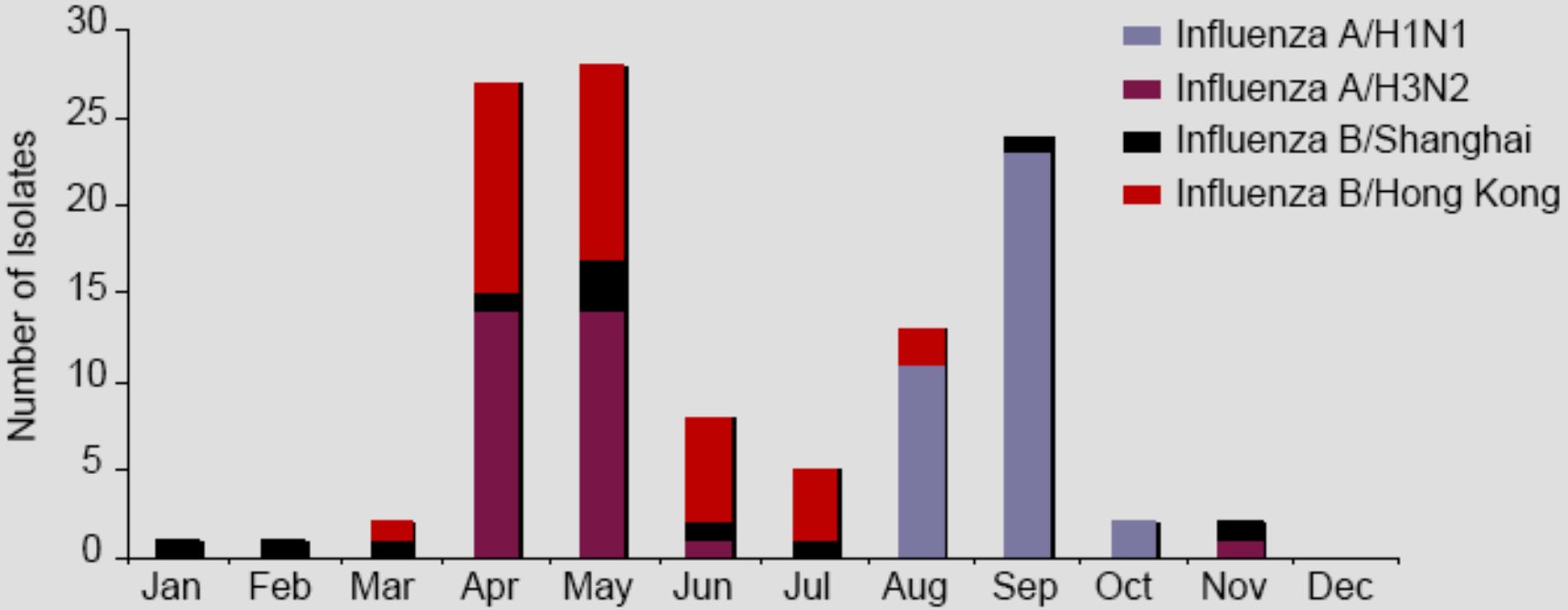




Corroborating data from ICDDRB project, Dhaka 2004 thru 2005

Figure 2: Influenza virus was isolated year round with the greatest number of cases isolated in April, May and September

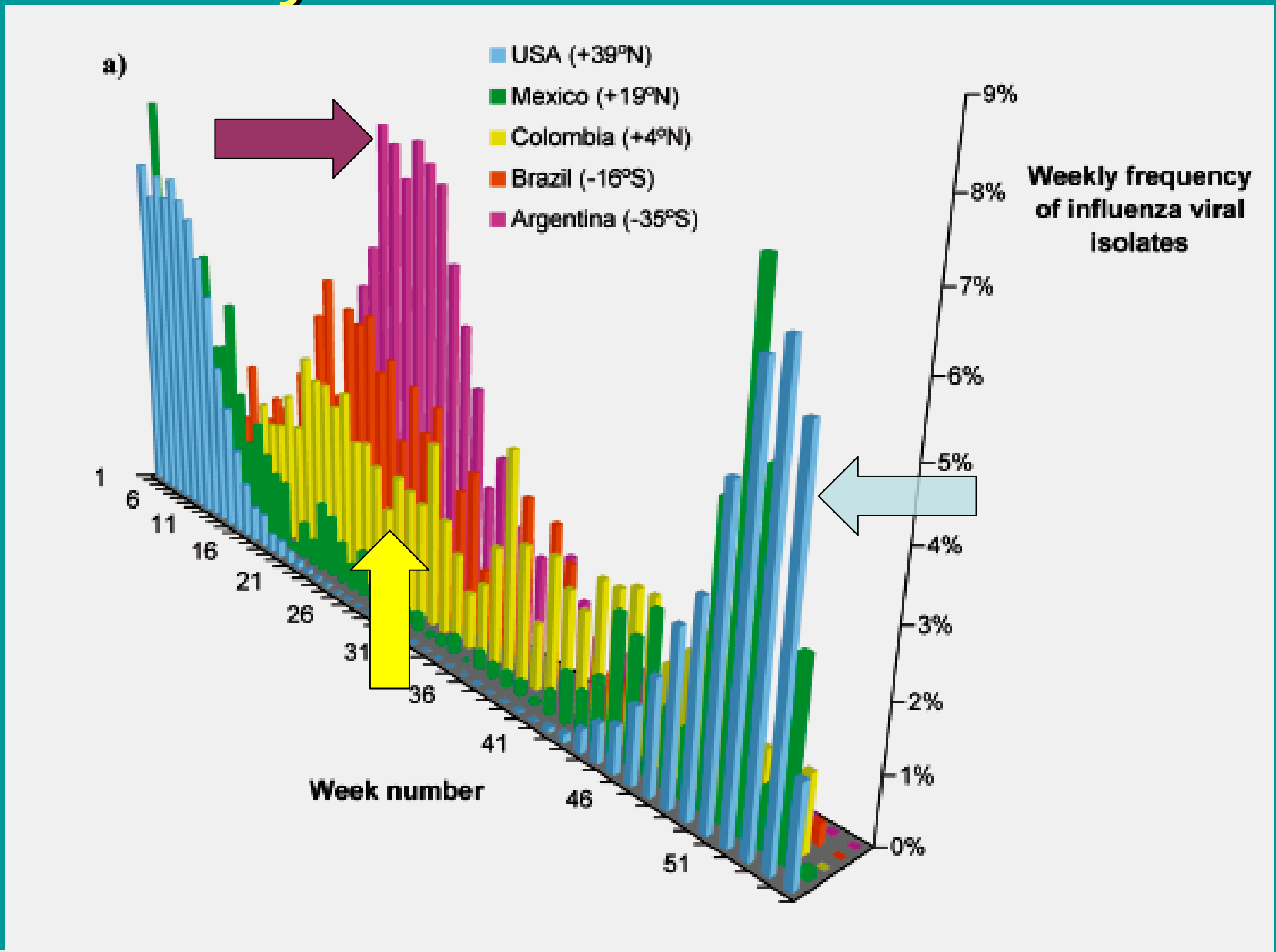
Data for 20 months from April 2004 thru Nov 2005



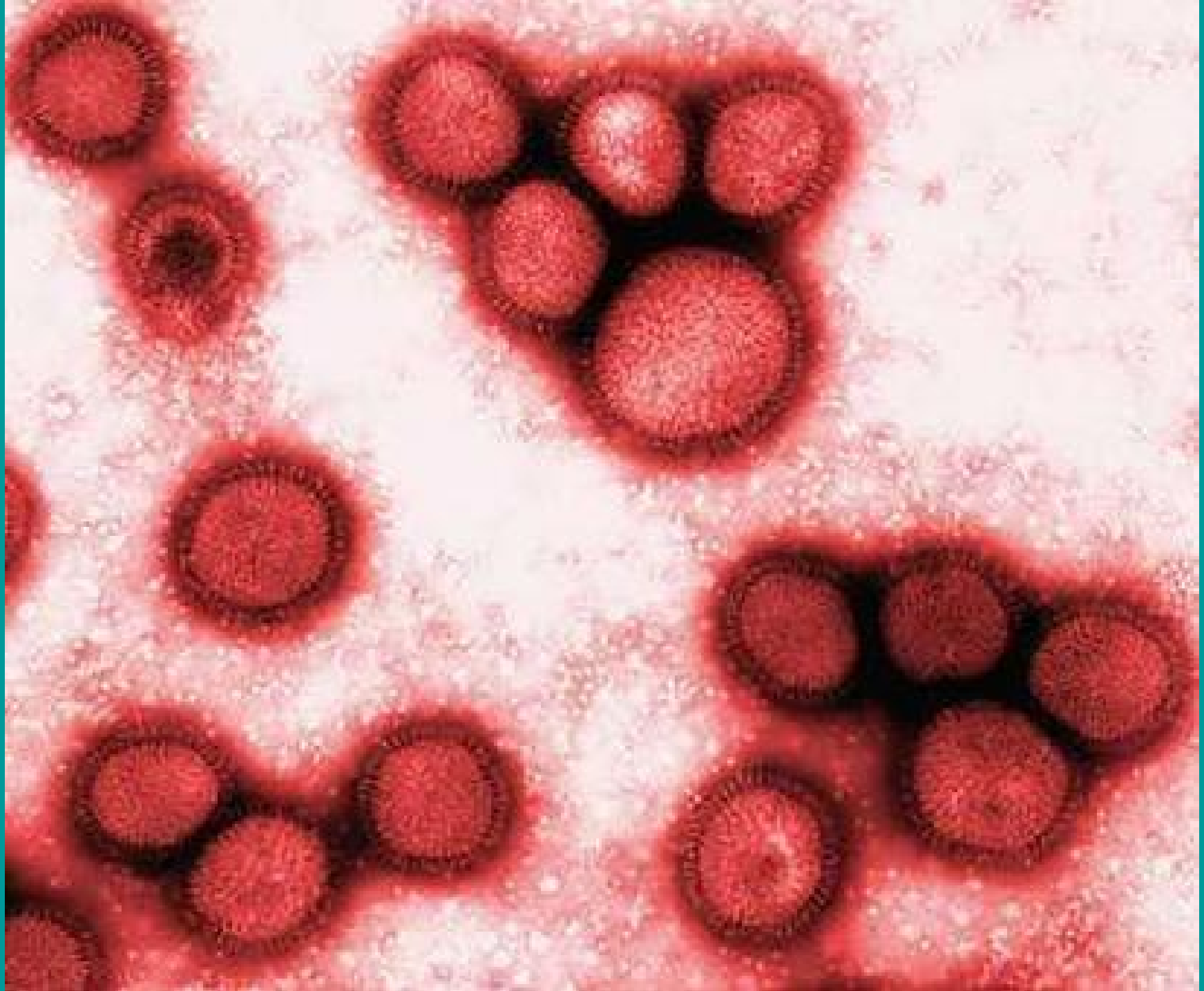
Reported by: Programme on Infectious Diseases and Vaccine Sciences, ICDDR,B.

Source: Health and Science Bulletin, ICDDRB,2006;4:1

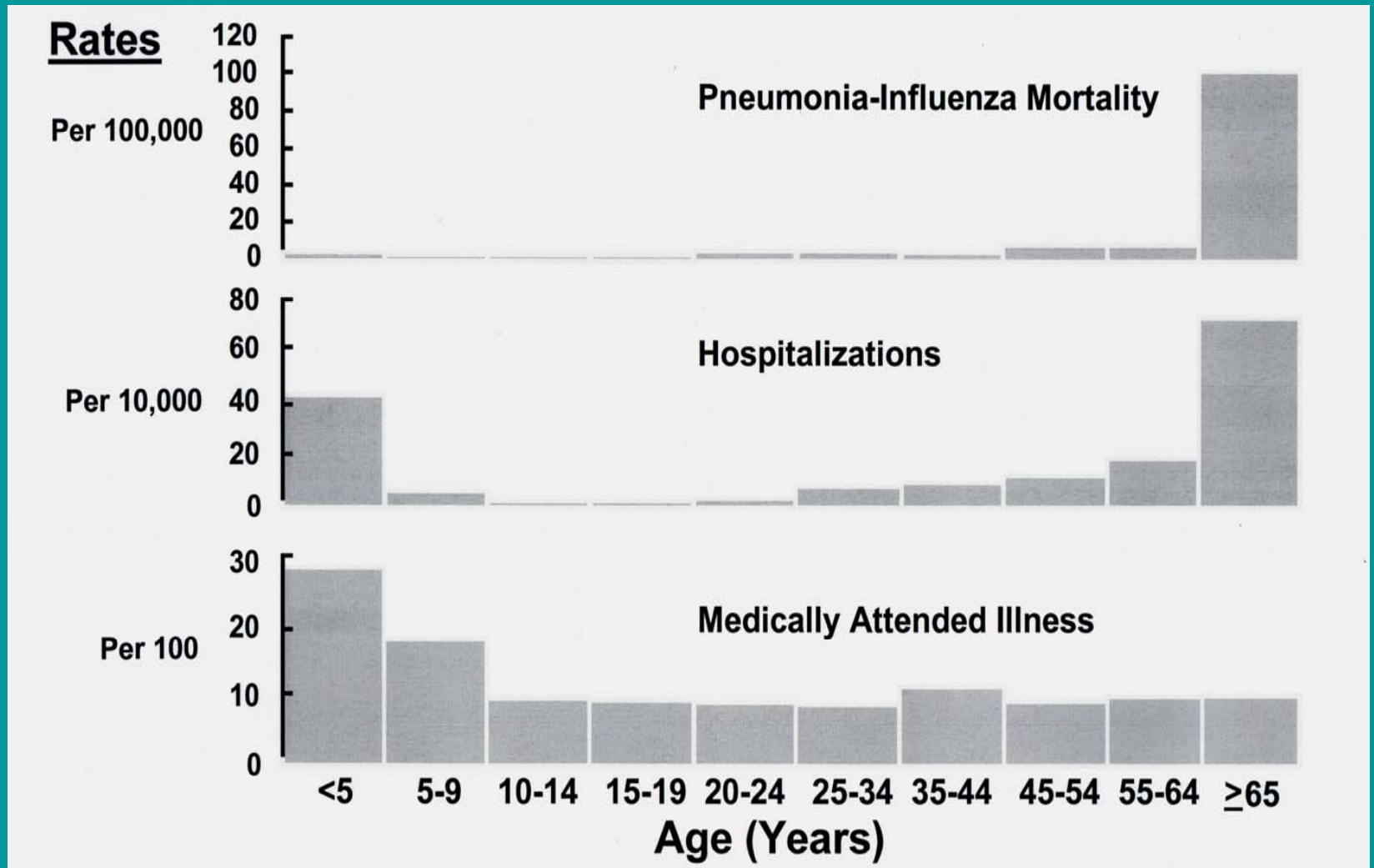
Seasonality is related to latitude



Citation: Viboud C, Alonso WJ, Simonsen L (2006) Influenza in tropical regions. PLoS Med 3(4): e89.

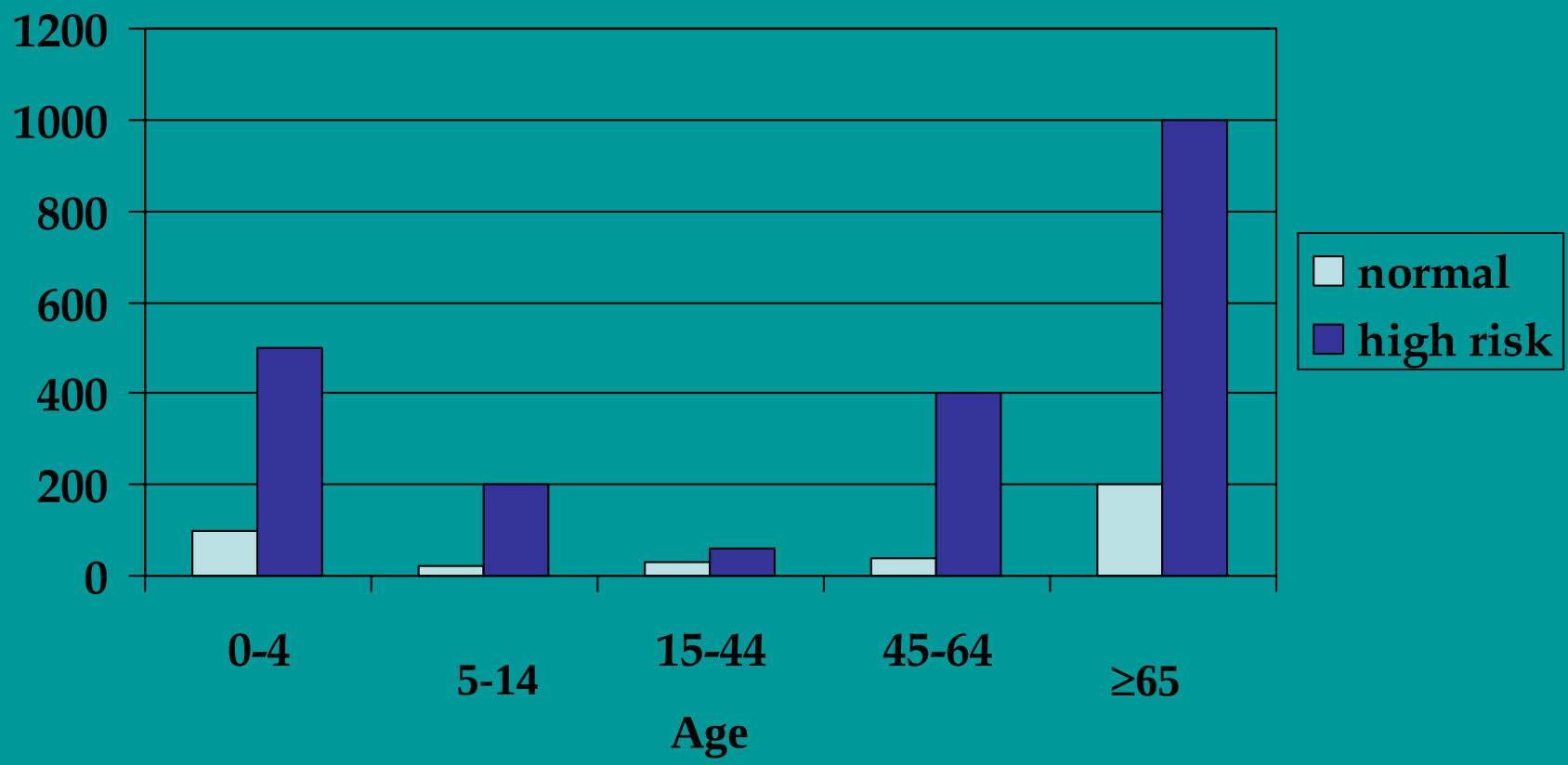


Age-specific rates of influenza morbidity and mortality in U.S.



Glezen WP. Emerging infections: pandemic influenza. Epidemiol Rev. 1996; 18(1),64-76.

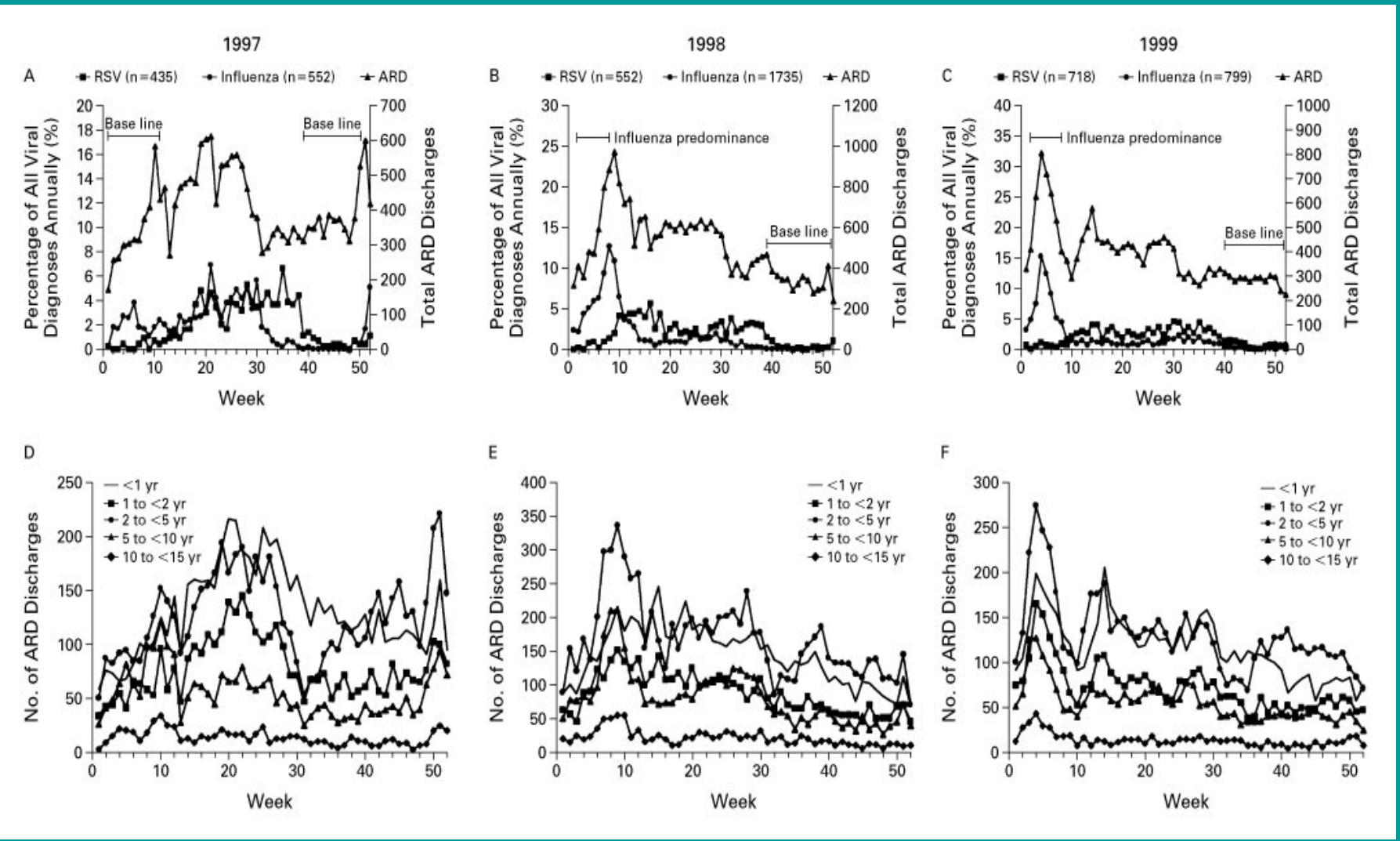
Influenza Hospitalization by Age Group (estimated in USA 1990's)



Source: Reprinted from Centers For Disease Control and Prevention

232*FluAgeGroup

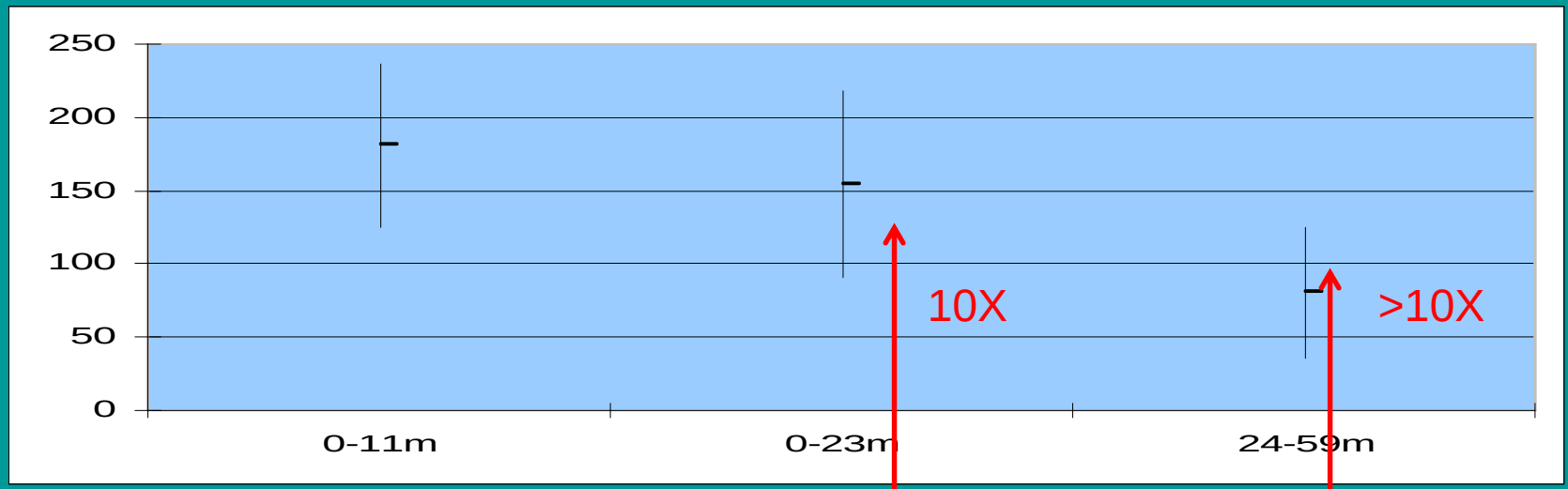
Hospital admissions in Hong Kong



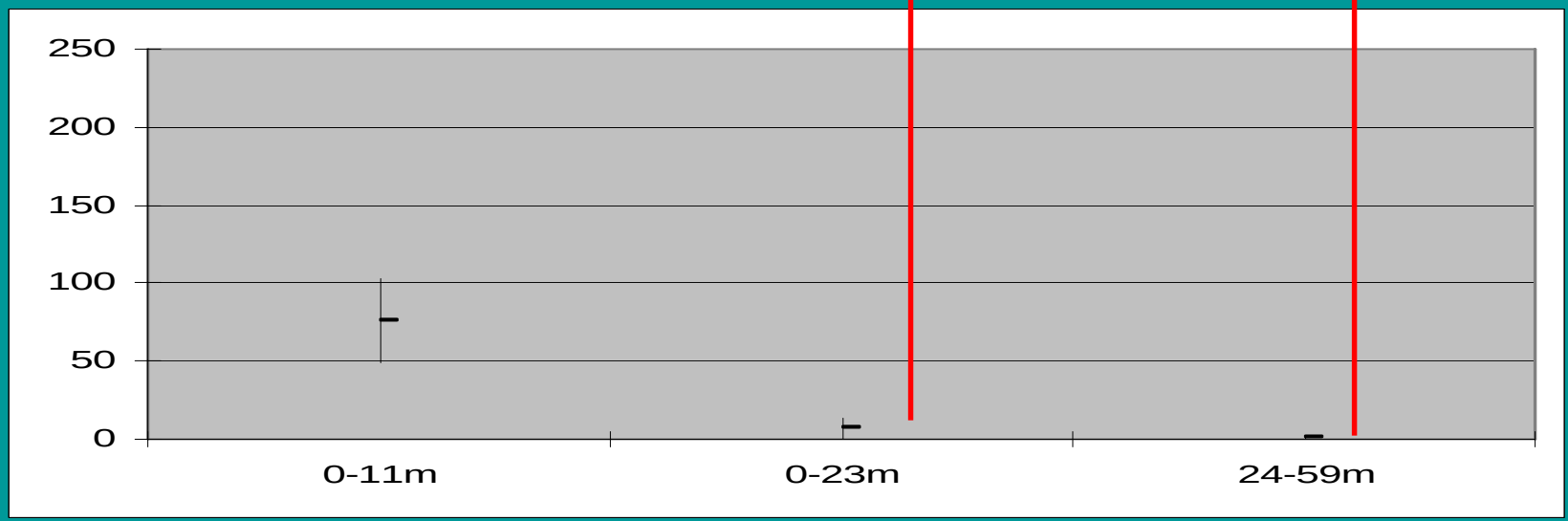
Hospitalization attributable to flu

rate/10,000 children

HK



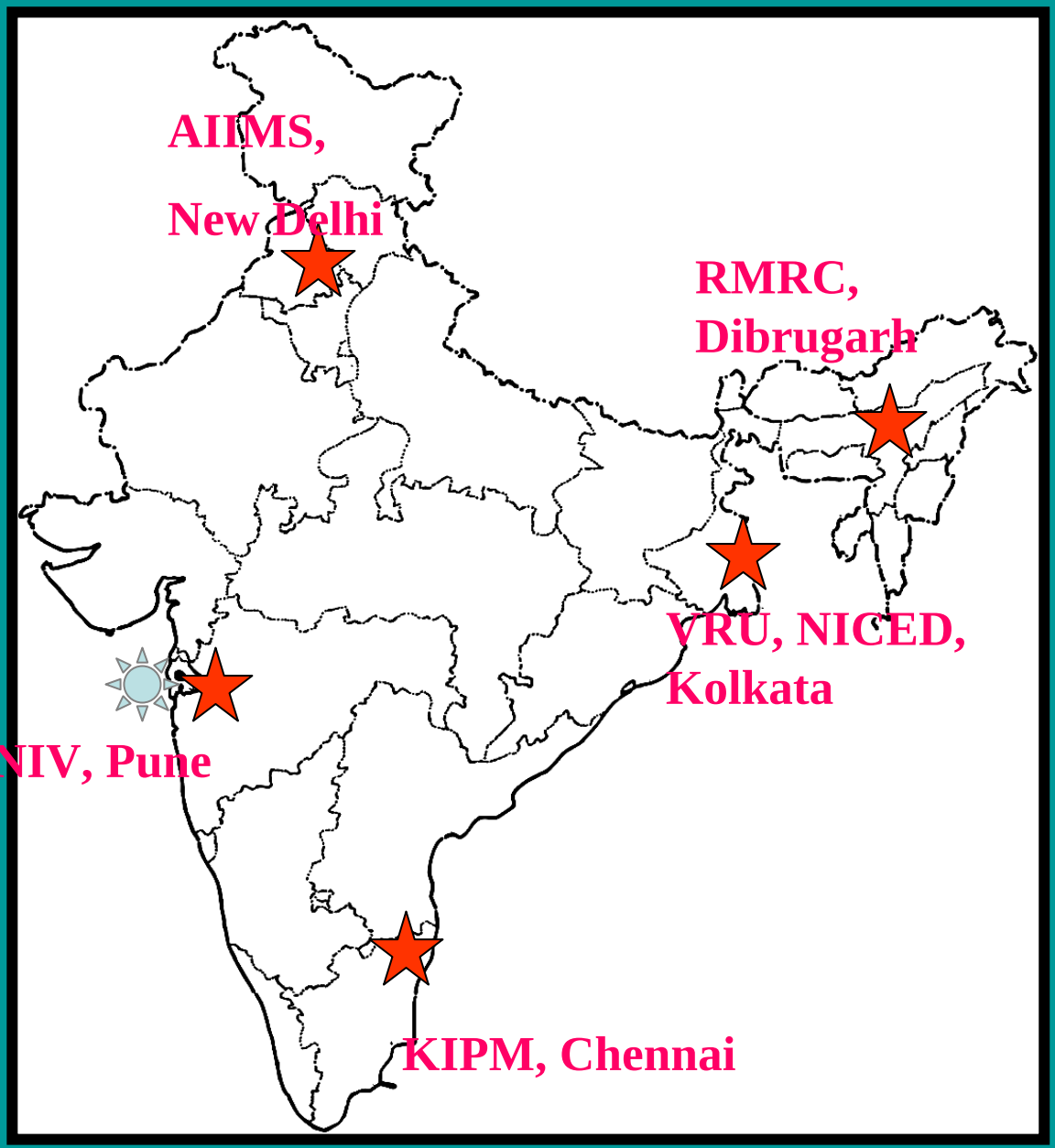
USA



New influenza surveillance network in India

5 centers supported by ICMR/CDC / WHO

Started July 2004



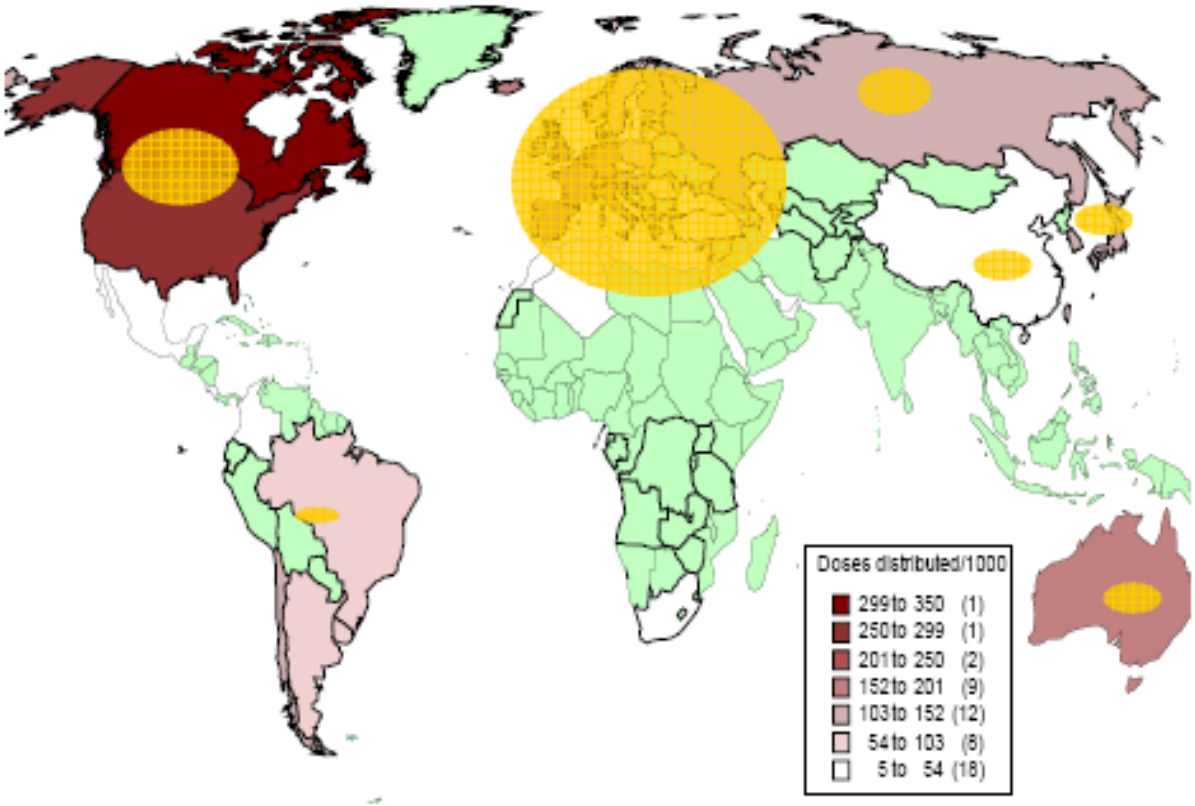
Annual flu epidemics in S. Asia

- Probably not a textbook stereotypic 6-8wk clinical febrile respiratory disease epidemic
- May vary with monsoon onset and severity
- May vary by latitude

- True burden in tropical Asia not defined

Flu vaccine production and use in Asia

- **Seasonal influenza vaccine consumption and production localized; relatively few companies**

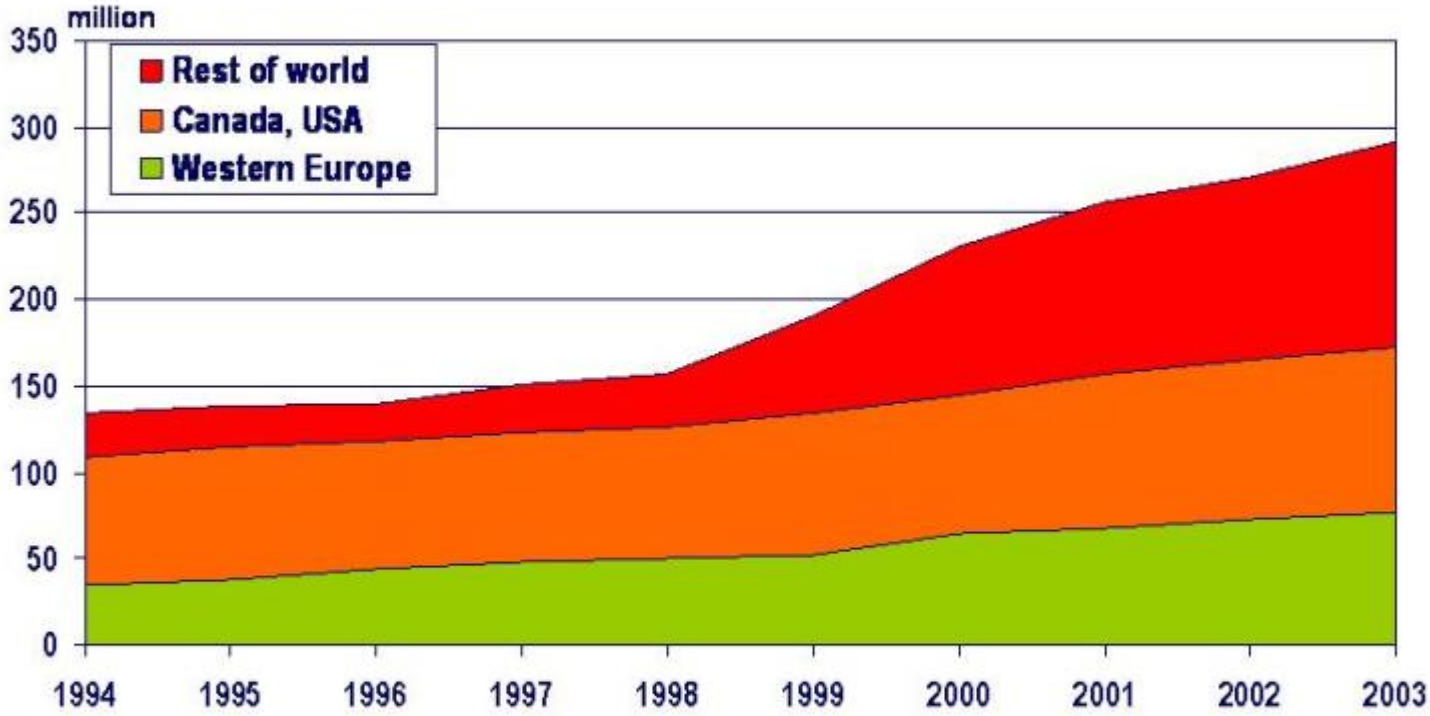


IVS Task Force, IFPMA 2003

9 COUNTRIES PRODUCE FLU VACCINE IN 2005

Australia,
Canada,
France,
Germany,
Italy,
Japan,
Netherlands,
United Kingdom
United States.

Number of influenza vaccine doses distributed in various regions
1994- 2003

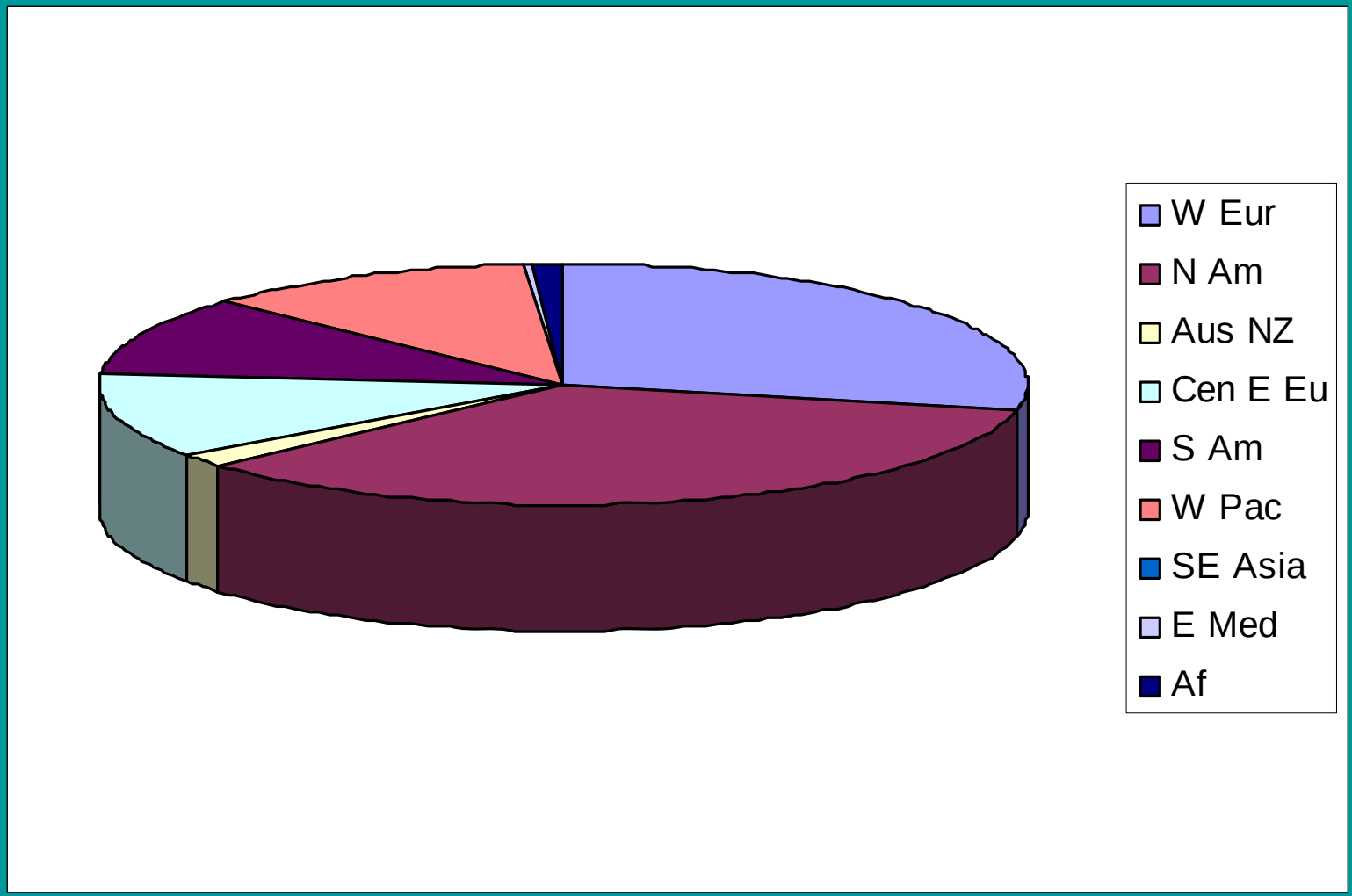


References:

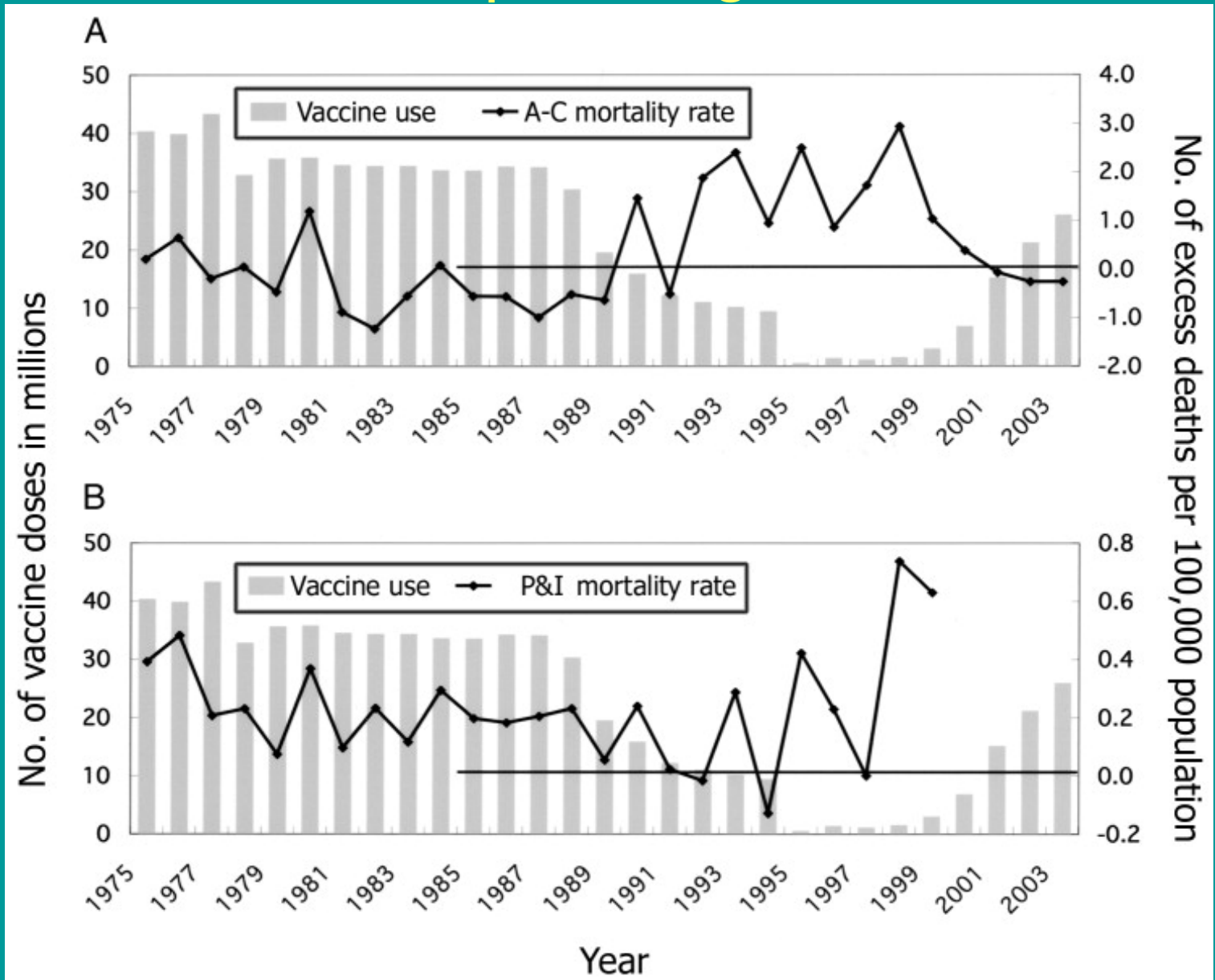
1994-99: Dr David Fedson

2000 -2003 Influenza Vaccine Supply Task Force and WHO *Weekly Epidemiological Record* No. 40, 2004, 79, 357–368

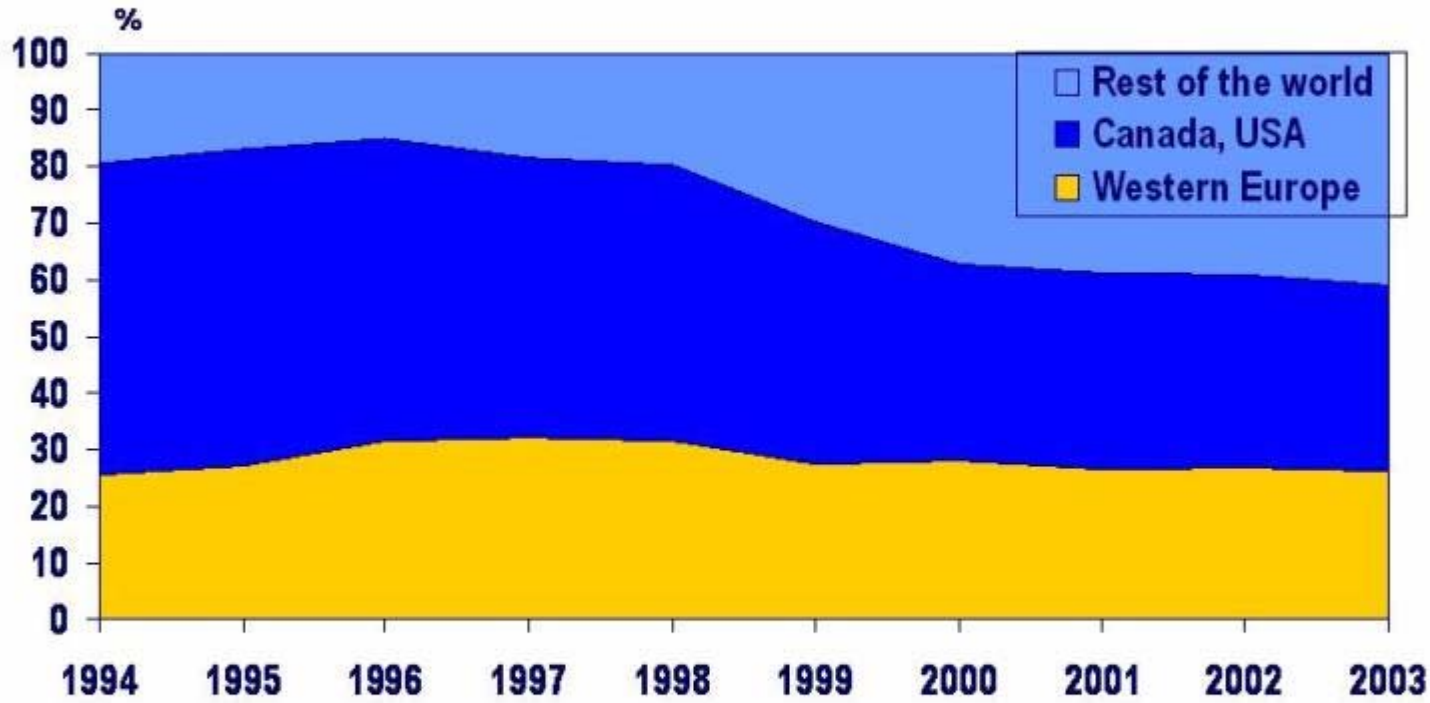
Regional distribution of flu vaccine 233m doses in 2000



Japan: 40-50 m doses per year, except during 1990s



Ratio of influenza vaccine doses distributed by region
1994-2003



References:

1994-99: Dr David Fedson

2000 -2003 Influenza Vaccine Supply Task Force and WHO *Weekly Epidemiological Record* No. 40, 2004, 79, 357–368

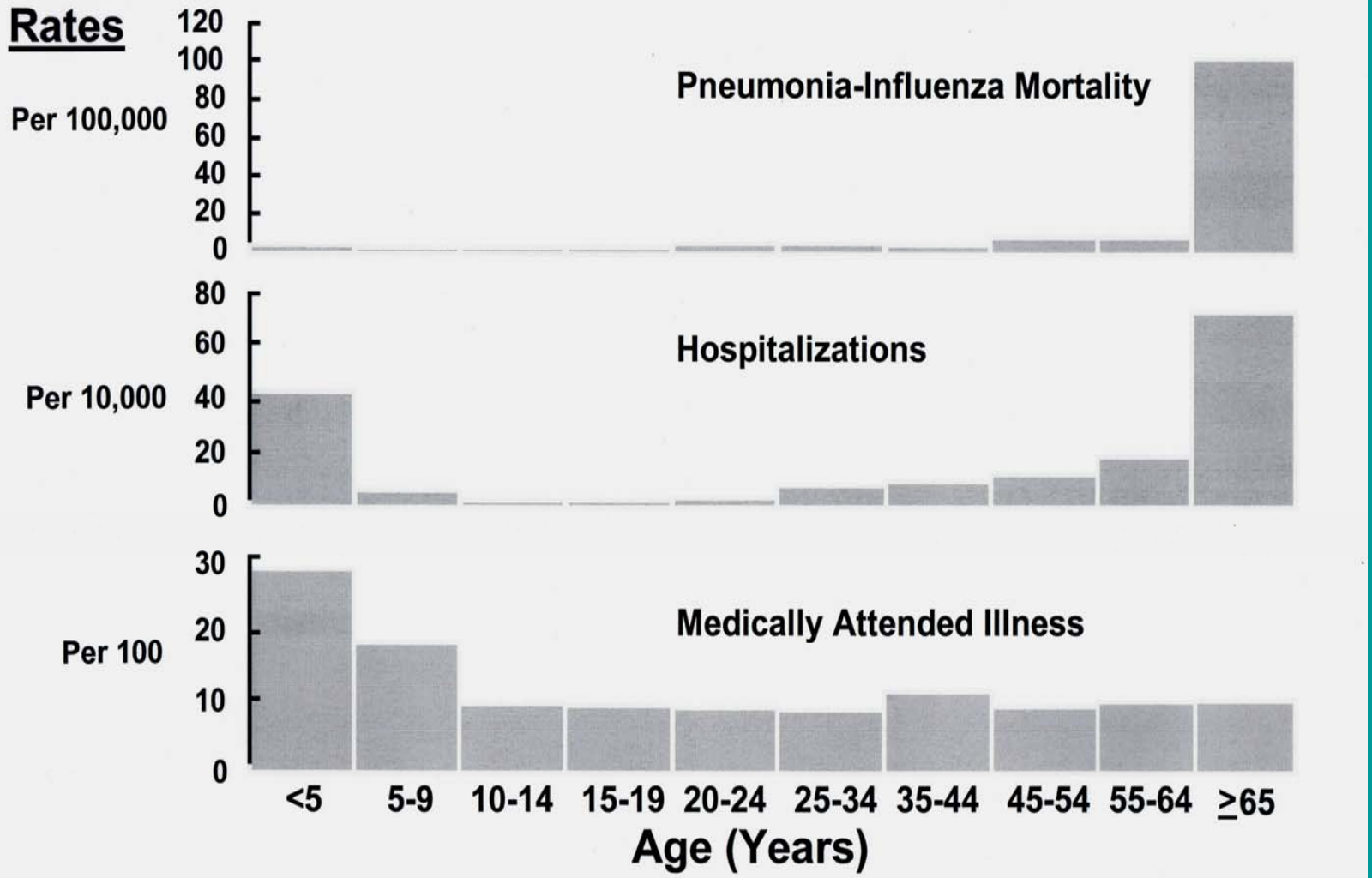
Vaccine policy

Children as target group,
for universal immunization

Pregnant women as target group

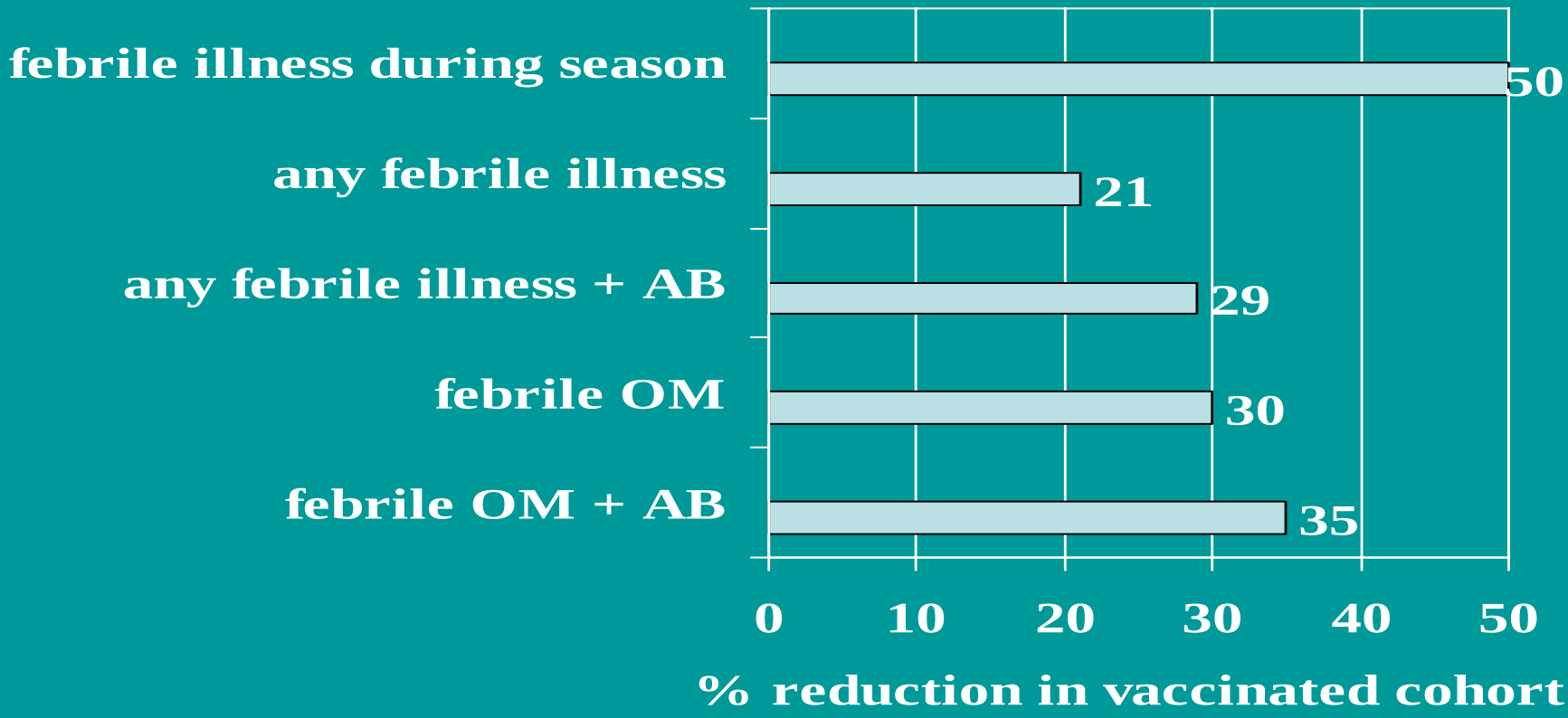
Both groups recommended
by US authorities, based on
hospitalization risk

Age-specific rates of influenza morbidity and mortality



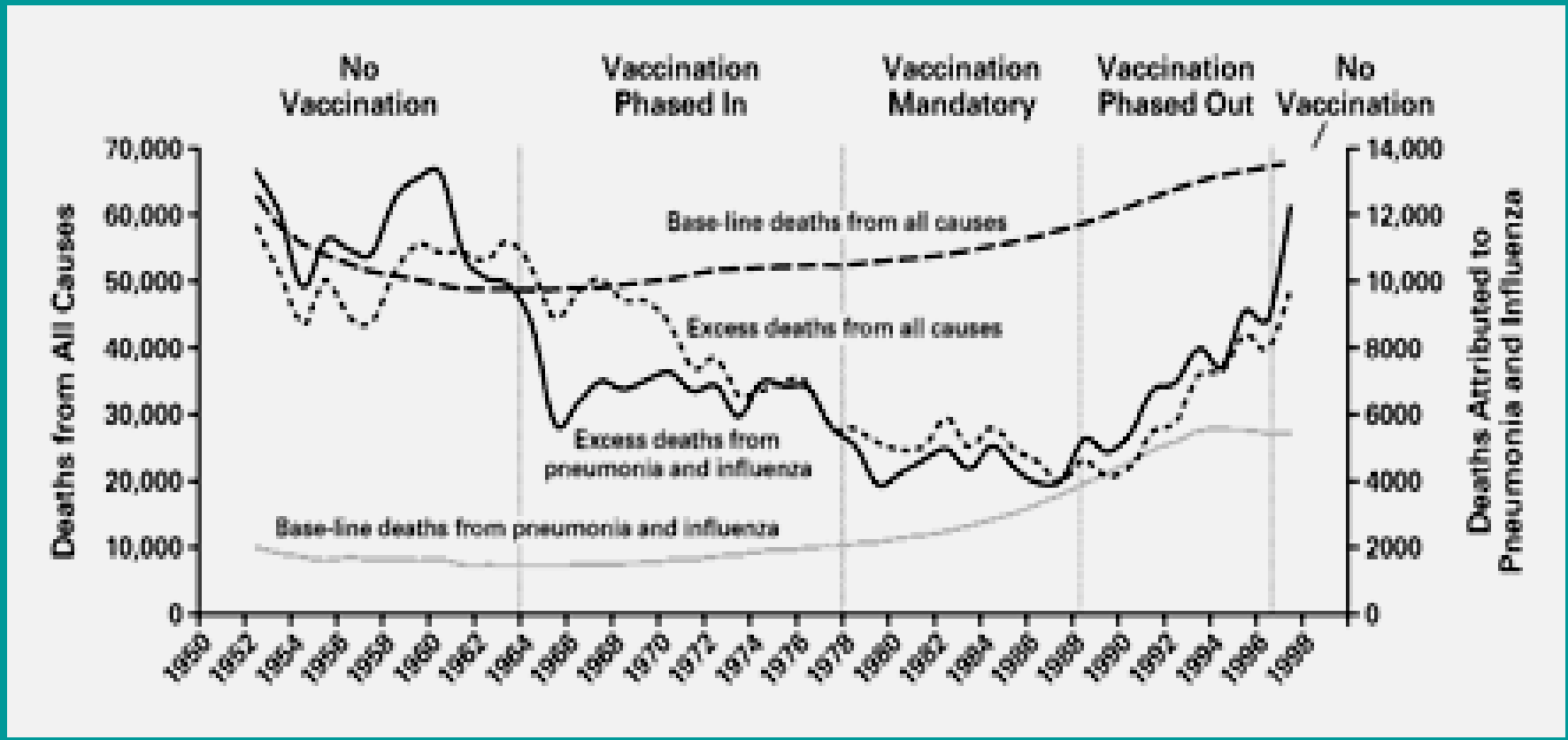
Glezen WP. Emerging infections: pandemic influenza. Epidemiol Rev. 1996; 18(1),64-76.

Effect of live attenuated trivalent flu vaccine in children



Source: Belshe, NEJM 1998;378:1405

Efffect of schoolchild immunization on adult disease. Japan



Childhood vaccination prevented about 39,000 adult deaths/yr;
or about 1 adult death per 420 children vaccinated

Source: NEJM 2001;344:889

Flu vaccine in day care children

Design: 24 – 60 m old children in day care. Randomized to flu (IM) or hepatitis A vaccine

Outcome: illness in contacts at home

Results: in 5 – 17 y.o. contacts

outcome	reduction
missed school days	72%
MD visit	91%
A/B Rx	88%
adult missed work	100%

Hurwitz JAMA 2000;284;1677

Influenza vaccination of children protects nearby adults

Place	child vac. rate	effect in unvaccinated adults
Tecumseh, MI 1980's	85% school children	18 – 48% ↓ in "flu-related illness"
S.E. Texas 2003-04	20-25% <5	8 – 18% ↓ in "med-attended ARI >25 years"
Japan 1978-88	all school children	37 – 47,000 ↓ "all cause deaths" in elderly
US daycare 1990's	100% <5 yr.	100% ↓ adult in home "missed work"

Flu vaccine in children reduces disease in them and in their families

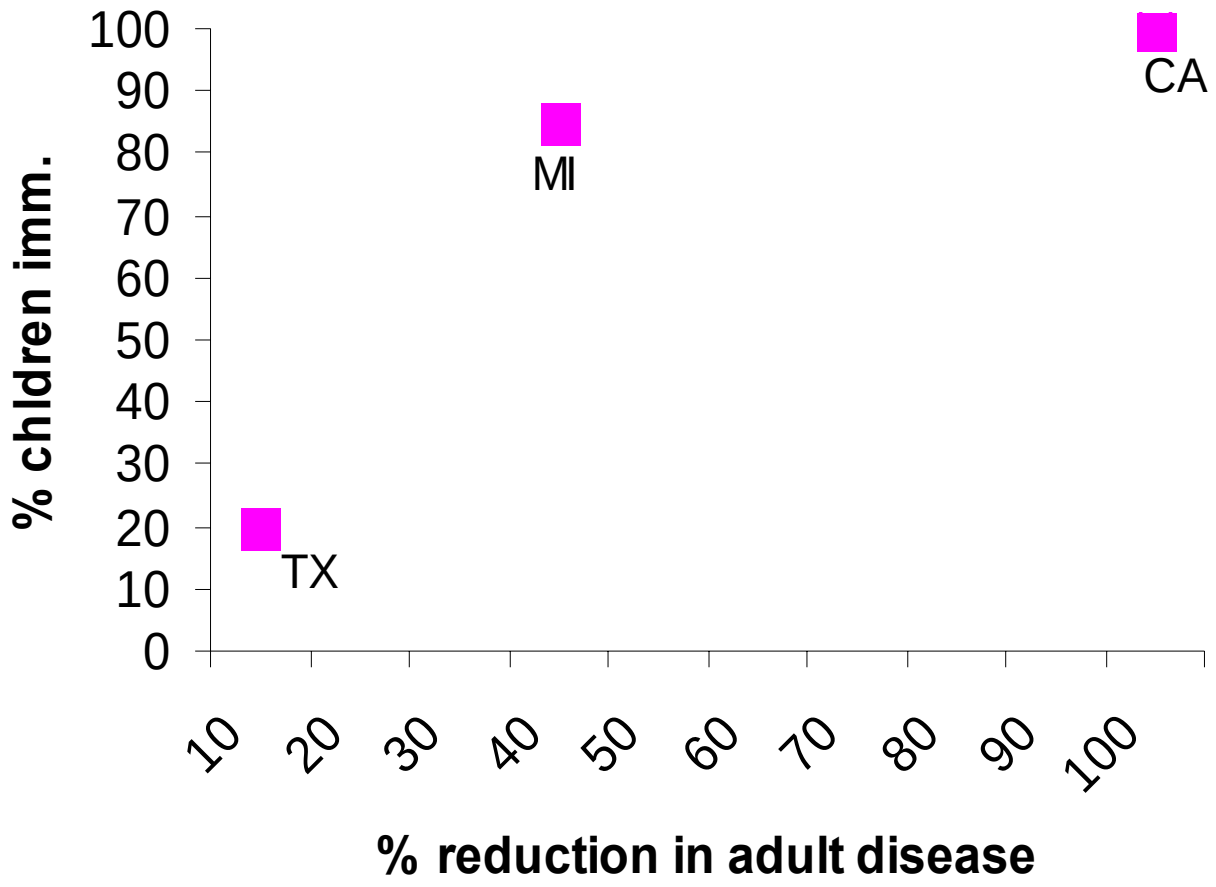
Table 6. Effectiveness of influenza vaccine among household contacts of influenza vaccinated healthy children and unvaccinated controls

Event	Household contacts of vaccinated children (n=726)	Household contacts of unvaccinated controls (n=370)	Vaccine effectiveness %*	p value
Respiratory tract infections	3·03 (1·68)	4·27 (1·68)	30	0·0005
Medical visits for respiratory illness	2·18 (1·37)	3·16 (1·77)	32	0·002
Lost maternal working days	3·22 (1·86)	4·78 (2·34)	33	0·001
Lost paternal working days	0·56 (0·46)	0·98 (2·24)	43	0·001
Days at home to care for ill children	0·57 (0·37)	3·22 (2·24)	83	<0·0001

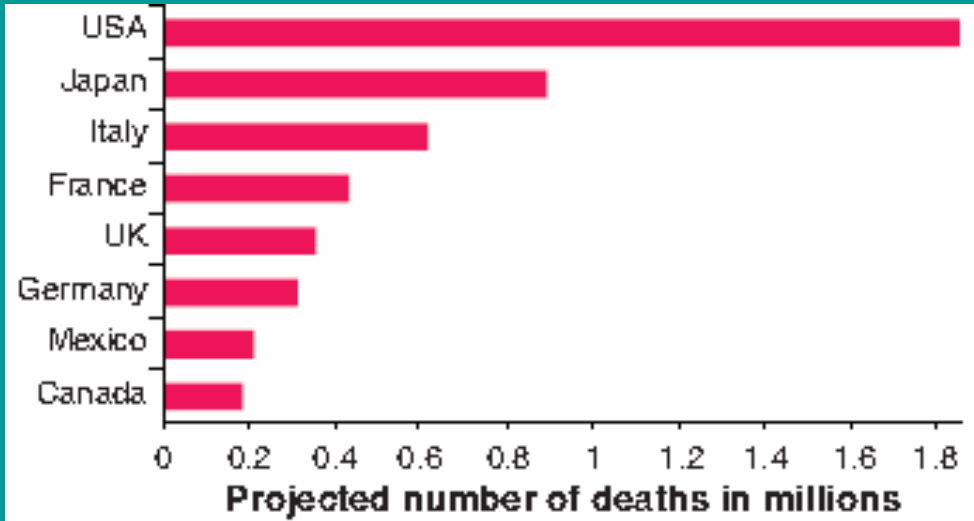
Mean values (SD). *Vaccine effectiveness=1 minus attack rate (defined as rate of illness divided by the total population) among household contacts of vaccinated children divided by attack rate among household contacts of controls. Adapted from reference 12.

Principi, et al. Ped IDJ 2003; 22: s207-10

Influenza vaccination of chldren protects nearby adults



Projected Influenza Pandemic Deaths



Projections of numbers of deaths during the next influenza pandemic for selected countries based on statistics from the 1918–1919 pandemic (*4*).

Source : K Stohr, Science. 2004 Dec ;306:2195-6.

Current WHO phase of pandemic alert

November 2005

CURRENT PHASE OF ALERT IN THE WHO GLOBAL INFLUENZA PREPAREDNESS PLAN

- WHO global influenza preparedness plan

Inter-pandemic phase New virus in animals, no human cases	Low risk of human cases	1
	Higher risk of human cases	2
Pandemic alert New virus causes human cases	No or very limited human-to-human transmission	3
	Evidence of increased human-to-human transmission	4
	Evidence of significant human-to-human transmission	5
Pandemic	Efficient and sustained human-to-human transmission	6

Benefit of pandemic influenza planning and fears:

- Improved surveillance
- Planning for vaccine strategies, vaccine supply
- Attention of media, governments, markets
- May break the vicious cycle of neglect, described for several other diseases